UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,685	06/26/2003	Mandeep Singh	6793CIP	5330

7590 07/16/2004

Samuels, Gauthier & Stevens LLP
Suite 3300
225 Franklin Street
Boston, MA 02110

EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 07/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,685	SINGH, MANDEEP	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/29/03, 10/29/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's preliminary amendment filed on January 9, which has been entered into the file.
- No amendment to the claims has been filed. Claims 1-15 remain pending in this application.

Claim Objections

1. **Claims 7-14 are objected to because of the following informalities:**

(1). The phrase "$\beta_1 < -1.0$" recited in claim 7 and the phrase "$-7 > \beta_1 > -25$" recited in claim 8 are wrong and indefinite. Since firstly there is no *unit* to make the equations meaningful and secondly the specification FAILS to support that the "β_1" assumes such large number. The applicant is respectfully noted that the values should be in terms of "10^{-6} per degrees Kelvin", (please see Table I to III). These errors make the scopes of the claims unclear.

(2). The phrase "a *coefficient* of optical path length" recited in claims 13 and 14 is indefinite and confusing since it is not clear what is this coefficient. It is believed that the phrase should read "a *thermal* coefficient of optical path length **change**".

(3). The parameter "β" recited in claim 14 is undefined which makes the scopes of the claim unclear.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 12-14 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach how could an etalon be formed by **simply** having strontium titanate as recited in claim 12.

The specification and the claims also fail to teach how could an etalon be formed by **simply** having a rutile material and how could a **coefficient of optical path length** be made zero in the etalon, as recited in claim 13.

The specification and the claims fail to teach how could a **coefficient of optical path length** be made zero in the etalon, as recited in claim 14.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipate by the Japanese patent issued to Shindo et al (JP 359163529A).

Shindo et al teaches an *etalon* that is comprised of a *titanic acid strontium*, (please see the abstract).

This reference has therefore anticipated the claim

6. Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by the patent issued to Nakayama (PN. 5,943,154).

Nakayama teaches an *optically controlled light control element* that can be used as an *etalon* (please see Figure 9 and column 52) wherein the light control element includes *strontium titanate film* ($SrTiO_3$), (please see column 52).

This reference has therefore anticipated the claim.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 6, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Shirasaki (PN. 5,982,488) in view of the disclosure of MTI (www.mticrystal.com).

Shirasaki teaches a *compensator* which experiences thermal expansion to *compensate* for changes in optical distance through transparent material within an ***etalon***, wherein the *etalon* (Figure 7(A)) comprises a *pair of reflecting film* (604) for defining a *cavity* that is consisted of *two transparent plates* (601 and 602), each having a refractive index (n or n') and a thickness (t or t') such that the *coefficient* of *thermal optical path length change* (Δ (nt)) is *greater than zero* for the first plate and the *coefficient* of the *thermal optical path length change* (Δ(n't')) is *less than zero* for the second plate and the two coefficients *compensate each other* to make the *total* optical path length *change* by a change of temperature to be **zero** or constant, (please see column 10, lines 34-54).

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the plates may include *rutile* material. However it is known in the art that the rutile material inherently has *negative* thermal optical coefficient (or negative Δ (nt)), (as shown by MCI Corporation), it would then have been obvious to one skilled in the art to choose suitable materials, such

as rutile, to make the etalon be insensitive to the temperature, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With regard to claim 6, these references do not teach explicitly to include an antireflective coating between the first and second materials of the etalon. However using antireflective coating on interface of optical elements is very well known practice in the art for the benefit of reducing unwanted reflection of the light at the interface, such modification would then have been obvious to one skilled in the art.

With regard to claim 13, Shirasaki teaches that the cavity of the etalon may comprise a transparent plate (603, Figure 7(B)) having the *coefficient of thermal optical path length change* with respect to the temperature change equals zero.

9. **Claims 2-5, 7-11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Shirasaki and MTI Corporation disclosure in view of the patent issued to Sterling et al, (please see 6,452,725).**

Shirasaki teaches *thermally stable etalon* having the cavity defined by the reflecting films be filled by *two transparent materials* that are having compensating coefficients of thermal optical path length change to make the *net* change of the optical path length extending through the two materials equals zero, with respect to the temperature change. Shirasaki teaches that the materials may include *polymers, and* in view of the disclosure of MTI Corporation the rutile inherently has negative thermal coefficient of optical path change which makes it a suitable material for making the etalon. **Sterling** et al in the same field of endeavor teaches a *thermally stable etalon* including two materials of compensating coefficients of thermal optical path length change, wherein the suitable materials for the two materials may include *BK7 optical glass and crystalline, (please see column 5).* Although these references do not teach explicitly that the materials may also include quartz or silicon, however these materials are all well

known optical materials in the art with inherent thermal optics coefficients and since both the Shirasaki reference and the Sterling et al reference teach the general condition for designing the thermally stable etalon, to select the *known materials* on the basis of its suitability for the intended used has been held to be within the general skill of a worker in the art and the modifications are therefore considered to be a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With regard to claims 7 and 15, by making the total optical path length change by the temperature, (i.e. $\Delta(n't') + \Delta(nt)$), to be zero one can easily obtain the relationship of t/t' to be equal to $-(n'* \beta')/ (n* \beta)$, wherein by definition $\beta = ((1/n)*(\Delta n/\Delta T) + (1/t)*(\Delta t/\Delta T))$.

With regard to claims 7 and 8, the thermal optics coefficient for rutile is less than –1. The feature concerning claim 8 cannot be further examined here since the values claimed here are wrong.

9. **Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Shirasaki in view of the Japanese patent issued to Shindo et al.**

Shirasaki teaches a *compensator* which experiences thermal expansion to *compensate* for changes in optical distance through transparent material within an *etalon*, wherein the *etalon* (Figure 7(A)) comprises a *pair of reflecting film* (604) for defining a *cavity* that is consisted of *two transparent plates* (601 and 602), each having a refractive index (n or n') and a thickness (t or t') such that the *coefficient* of *thermal optical path length change* (Δ (nt)) is *greater than zero* for the first plate and the *coefficient* of the *thermal optical path length change* ($\Delta(n't')$) is *less than zero* for the second plate and the two coefficients *compensate each other* to make the *total* optical path length change by a change of temperature to be **zero** or constant, (please see column 10, lines 34-54).

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the plates may include strontium titanate material. Shindo et al teaches that strontium titanate material may be used to design etalon and it is known in the art that the strontium titanate material

inherently has negative thermal optical coefficient (or negative Δ (nt)), it would then have been obvious to one skilled in the art to use suitable materials to make the etalon that is insensitive to the temperature, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.